STATEMENT OF

GUY F. CARUSO

ADMINISTRATOR

ENERGY INFORMATION ADMINISTRATION

U.S. DEPARTMENT OF ENERGY

before the

COMMITTEE ON GOVERNMENT REFORM

SUBCOMMITTEE ON ENERGY AND RESOURCES

U. S. HOUSE OF REPRESENTATIVES

September 14, 2005

Mr. Chairman and Members of the Committee:

I appreciate the opportunity to appear before you today to discuss the outlook for the U.S. natural gas market.

The Energy Information Administration (EIA) is the statistical and analytical agency within the Department of Energy. We are charged with providing objective, timely, and relevant data, analysis, and projections for the use of the Department of Energy, other Government agencies, the U.S. Congress, and the public. We do not take positions on policy issues, but we produce data and analysis reports that are meant to assist policy makers make energy policy. Because we have an element of statutory independence with respect to the analyses that we publish, our views should not be construed as representing those of the Department of Energy or the Administration.

The devastation of Hurricane Katrina affected offshore natural gas production in the Gulf of Mexico as well as onshore natural gas processing facilities. Natural gas production in the Federal Gulf of Mexico, which normally accounts for 19 percent of total U.S. natural gas production, suffered a peak shut-in of 8.8 billion cubic feet (bcf) on August 30, 2005. As of September 12, the shut-in volume was down to about 3.8 bcf. Natural gas spot market prices at the Henry Hub rose sharply in the days following Katrina, reaching $12.72 per thousand cubic feet (mcf) on August 30, compared to $10.16 per mcf on August 26. The spot price peaked at $13.08 per mcf on August 31, but dropped to $11.70 per mcf the following day. At the close of trading on Friday, September 9, the Henry Hub spot price was $11.36 per mcf, about $1.19 per mcf higher than the price on Friday, August 26, before the storm.

Although natural gas transmission pipelines in the path of Hurricane Katrina survived with minimal damage, the hurricane damaged natural gas processing facilities on the Gulf Coast with a combined capacity of more than 5 bcf per day. The loss of processing capacity could delay a complete recovery of some natural gas production. Our understanding of the situation is rapidly evolving, and I will discuss this in my oral remarks.

Even prior to Hurricane Katrina, natural gas prices were very high by historical standards, with September futures prices at $10.85 per million Btu ($11.18 per mcf), more than double the levels of 1 year before. In August, the Henry Hub natural gas spot price averaged over $9 per mcf, as hot weather in the East and Southwest increased natural gas-fired electricity generation for cooling demand and crude oil prices increased.

Both demand and supply factors will determine the future path of natural gas prices. In this testimony I will consider both short-term projections, as discussed in the monthly *Short-Term Energy Outlook* that was released on September 7, and a long-term perspective based on a case from the *Annual Energy Outlook 2005*, published in February 2005.

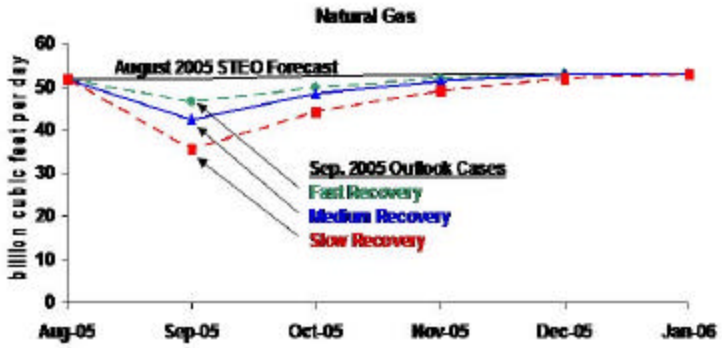
Short-Term Projections

Considerable uncertainty remains regarding the extent of damage and the schedule for recovery. For the September *Outlook*, EIA examined three plausible recovery scenarios for oil and natural gas markets: Fast Recovery, which assumes a very favorable set of circumstances for getting supplies back to normal; Slow Recovery, which assumes that significant outages in oil and natural gas production and delivery from the Gulf area continue at least into November; and Medium Recovery, which assumes a path between Slow and Fast Recovery. In all cases, return to normal oil and gas production and distribution is achieved or nearly achieved by December.

Production, Storage and Imports. Domestic natural gas production in 2005 is expected to drop by 1.5 percent in the Medium Recovery case due mainly to the major disruptions to infrastructure in the Gulf of Mexico from both Katrina and Ivan. Preliminary EIA data through June show an apparent decrease in output of 1.5 percent for the first half of 2005 compared to the same period in 2004, as recovery from the disruption caused by Hurricane Ivan in 2004 was not yet complete. In 2006 natural gas production is expected to rebound, on the strength of record drilling activity. By the middle of next year, more than 1,500 drilling rigs are expected to be exploring for natural gas in the United States, due to the high prices. This continues a steady rise in the rig

count, which began in April 2002. As a result, U.S. natural gas production is expected to increase by 3.5 percent in 2006, reaching 19.3 trillion cubic feet (tcf).

Natural Gas Production Cases After Katrina



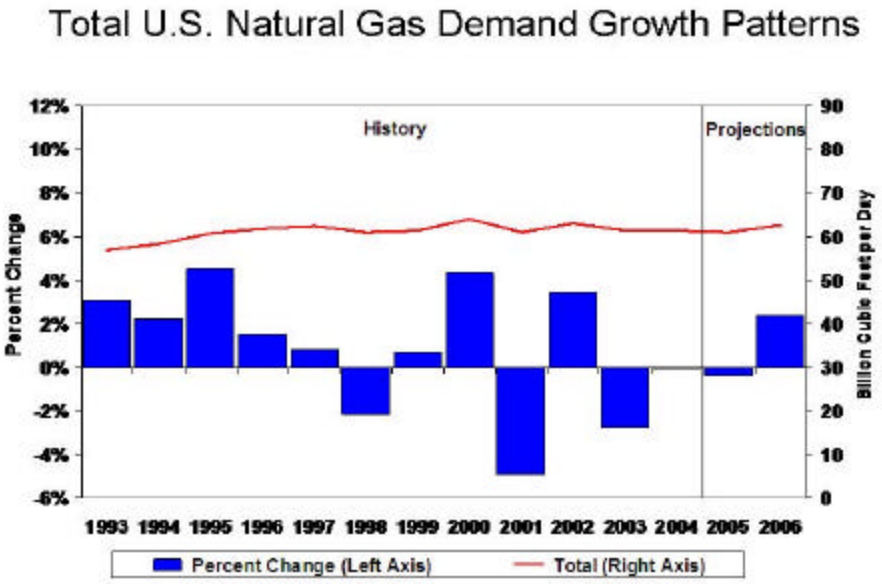
Source: Short-Term Energy Outlook, September 2005

Working gas in storage was estimated at 2,633 billion cubic feet (bcf) as of September 2, which is 95 bcf lower than 1 year ago but still 95 bcf above the 5-year average. Katrina is likely to reduce the peak storage achievable over the remainder of the injection season from what was expected previously. Storage at the end of October is expected to be about 270 bcf below the year-ago level and about 50 bcf below the 5-year average.

Imports of liquefied natural gas (LNG) into the United States appear to have increased slightly in the first half of 2005, compared to the same period in 2004. Currently, total LNG imports for 2005 are expected to be approximately 710 bcf compared to 650 bcf in 2004. In 2006, LNG imports are expected to increase more significantly by 370 bcf.

Short-Term Natural Gas Demand. EIA expects demand to decline slightly in 2005 in the Medium Recovery case, compared to 2004, as a result of reduced industrial demand. Industrial demand is projected to be lower in the Medium Recovery case in all four quarters of 2005, but biggest difference is in the fourth quarter due to the hurricane.

In 2006, natural gas demand is expected to be 2 percent higher than in 2005 in the Medium Recovery case, as weather returns to normal, industrial production continues to grow, and natural gas prices ease. Assuming normal weather, natural gas-weighted heating degree-days would be 3 percent cooler than this year, increasing residential demand. Total industrial production is expected to be up, boosting industrial natural gas demand by almost 4 percent next year.

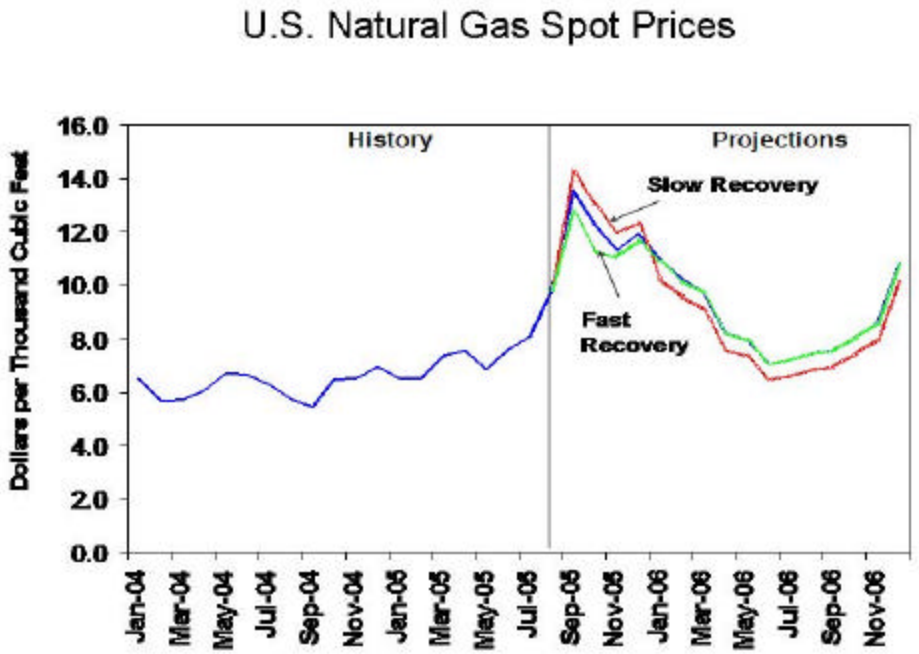


Source: Short-Term Energy Outlook, September 2005

Prices. In the Medium Recovery case, the Henry Hub natural gas spot price is expected to average $8.82 per mcf in 2005 and $8.42 per mcf in 2006. The spot price for the fourth quarter of 2005 ranges from $11 to $13 per mcf, depending on the speed of the recovery, compared to $6.47 per mcf in the fourth quarter of 2004. In 2005, the average annual price is expected to range from $8.75 to $9.14 per mcf. Spot prices are expected to ease going into 2006 as the effects of Katrina fade. However, prices at the Henry Hub are likely to remain above $10 per mcf until peak winter demand is over.

Regionally, natural gas spot prices in 2005 are expected to range between 37 and 50 percent above the 2004 average levels in the Medium Recovery case. Delivered prices to end-use customers in most regions are expected to exhibit double-digit percent

increases for the second year in a row. During the heating season, we expect residential natural gas prices in the Medium Recovery case to be about 47 percent higher than in the heating season of 2004-2005, which had a 14-percent increase over the previous heating season.



Source: Short-Term Energy Outlook, September 2005

Household Natural Gas Heating Expenditures. In the Medium Recovery case, residential per-household expenditures for natural gas this winter are expected to be 71 percent higher than last year in the Midwest, ranging from 69 to 77 percent higher across the three cases. Increases are expected to be particularly strong in the East North Central region (Ohio, Indiana, Illinois, Michigan, and Wisconsin) because of expected higher heating-related demand in comparison to the relatively mild conditions seen last year. These estimates reflect normal weather conditions, and colder or warmer weather could have a significant impact.

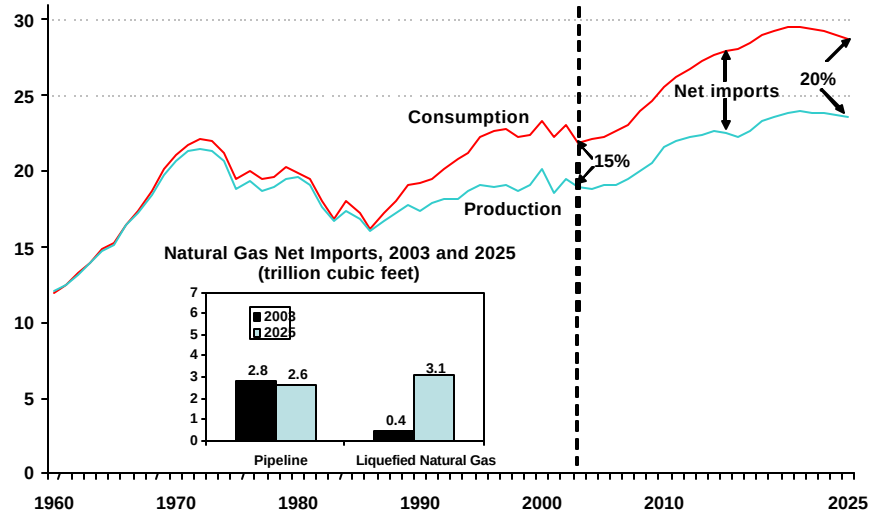
Longer-Term Projections

EIA's current long-term energy scenarios the *Annual Energy Outlook 2005* were developed in the second half of 2004. Because of the uncertainty of crude oil prices at that time, EIA analyzed a wider range of potential crude oil price cases than usual. The projections discussed in this testimony are based upon the case with the highest assumed world oil prices, called the "High B" case.

World oil prices, measured as the imported refiners' acquisition cost (IRAC), which is currently more than $6 per barrel below the price of West Texas Intermediate (WTI) that is widely quoted in press reports, averaged about $35.07 per barrel in 2004 (2003 dollars). In the highest price case in the *Annual Energy Outlook 2005*, projected oil prices in IRAC terms are assumed to decline from the current high level to $37.00 per barrel in 2010 and subsequently rise to $48.00 per barrel in 2025, all in constant 2003 dollars. World oil demand is expected to increase from 80 million barrels per day in 2003 to 111 million barrels per day in 2025.

By 2025, total U.S. natural gas consumption is expected to increase to almost 29 trillion cubic feet (tcf) or 22 percent of total U.S. energy consumption. Domestic natural gas production is expected to increase more slowly than consumption over the forecast, rising from 19.0 tcf in 2003 to 23.5 tcf in 2025. The difference between consumption and production is made up by increasing imports, particularly LNG, with a 2.7-tcf net increase expected over 2003 levels. By 2025, we expect expansion at three of the five existing LNG import terminals and construction of several new terminals.

Natural Gas Production, Consumption, and Imports, 1970-2025 (trillion cubic feet)

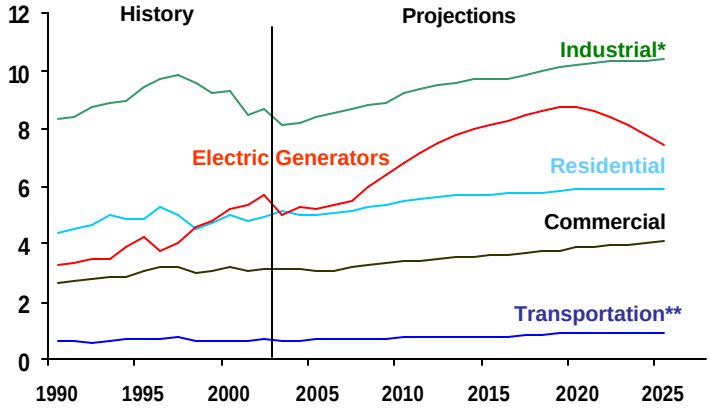


Source: *Annual Energy Outlook 2005-High B Oil Price Case*

Consumption. U.S. natural gas consumption is expected to increase at an average annual rate of 1.1 percent between 2003 and 2025. Natural gas consumption by electric generators is expected to increase by about 45 percent over the forecast, from 5.1 tcf in 2003 to 7.4 tcf in 2025, which is an average annual growth rate of 1.7 percent. Demand by electricity generators is expected to account for 26 percent of total natural gas consumption in 2025.

Most new electricity generation capacity is expected to be fueled by natural gas, which is expected to be favored over coal due to lower capital costs, higher fuel efficiencies, shorter construction lead times, and lower emissions, which outweigh the higher fuel costs. After 2020, however, the steady increases in natural gas prices cause natural gas to begin losing market share to coal.

U.S. Natural Gas Consumption by Sector, 1990-2025 (trillion cubic feet)



* Includes lease and plant fuel
** Includes pipeline fuel
Source: *Annual Energy Outlook 2005-High B Oil Price Case*

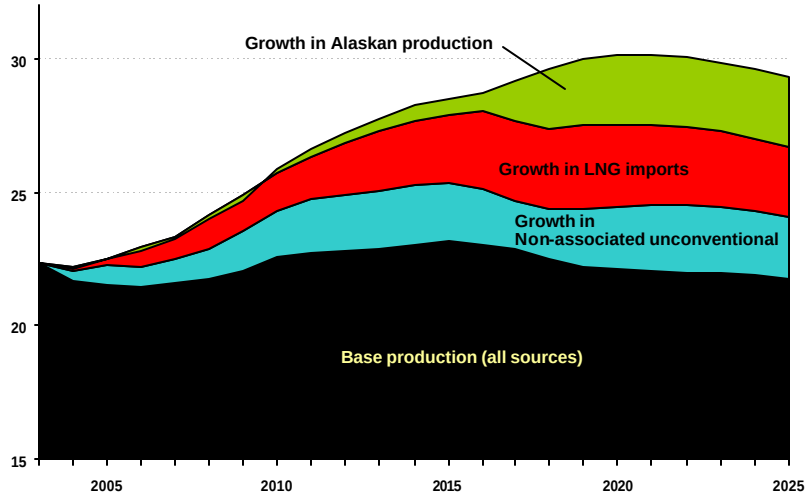
The industrial sector is the largest natural gas-consuming sector, with significant amounts used in the bulk chemical and refining sectors. Industrial consumption, excluding lease and plant fuel, is expected to increase by 2.0 tcf over the forecast period, driven primarily by macroeconomic growth.

Combined consumption in the residential and commercial sectors is projected to increase by 1.7 tcf from 2003 to 2025, driven by increasing population and economic growth. Natural gas remains the overwhelming choice for home heating throughout the forecast period.

Production. Increasing natural gas production is supported by rising wellhead natural gas prices, relatively abundant resources, and improvements in production technologies, particularly for unconventional natural gas. The national average wellhead price is projected to reach $5.32 per mcf in 2003 dollars by 2025. Increased U.S. natural gas production through 2025 comes primarily from unconventional sources and from Alaska. Unconventional natural gas production increases by 2.3 tcf over the forecast period, largely because of expanded tight sands gas production in the Rocky Mountain region. Annual production from unconventional sources is expected to account for 38 percent of production in 2025, more than any other source, compared to 35 percent today. Economic conditions allow an Alaskan pipeline to begin moving natural gas to the lower-48 States in 2017. Alaska accounts for most of the growth in domestic natural gas

production, growing by 2.6 tcf over the forecast period. Lower-48 onshore non-associated conventional natural gas production declines by about 650 bcf through 2025, as resource depletion causes exploration and development costs to increase.

Major Sources of Incremental Natural Gas Supply, 2003-2025 (trillion cubic feet)



Source: *Annual Energy Outlook 2005-High B Oil Price Case*

Depletion. A key question facing producers and policy makers today is whether natural gas resources in the mature onshore lower-48 States have been exploited to a point at which more rapid depletion rates eliminate the possibility of increasing, or even maintaining, current production levels at reasonable cost. Depletion is a natural phenomenon that accompanies the development of all nonrenewable resources. Depletion is the progressive reduction of the overall volume of a resource over time as the resource is produced. In the oil and natural gas industry, depletion may also refer more narrowly to the decline in production associated with a particular well, reservoir, or field. As existing wells, reservoirs, and fields are depleted, new resources must be developed to replace depleted reservoirs.

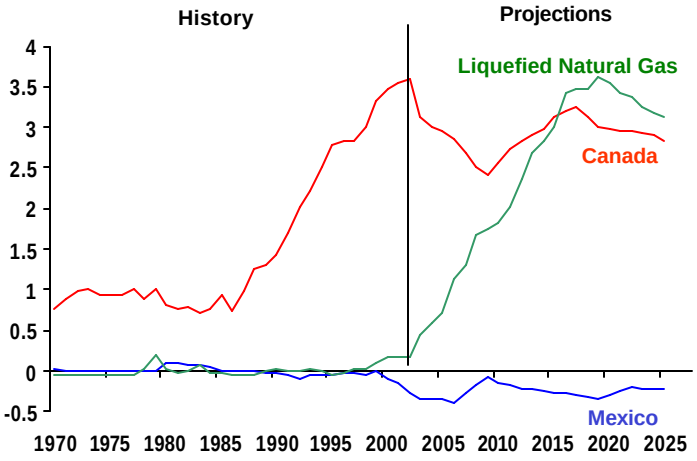
Historically, depletion has been counterbalanced by improvements in technology that have allowed natural gas resources to be discovered more efficiently, have extended the economic life of existing fields, and have allowed natural gas to be produced less expensively, making available resources that previously were too costly to develop. In

these natural gas projections, technological progress for both conventional and unconventional recovery is expected to continue to enhance exploration, reduce costs, and improve production technology.

The depletion of conventional and unconventional natural gas resources is expected to continue over the projection period as the demand for natural gas increases, continuing the trend that began in the mid-1990s. Nevertheless, with sustained wellhead prices generally over $4 per mcf (in 2003 dollars) and continued technological improvements, lower-48 unconventional natural gas production is expected to increase by more than 34 percent over current levels.

Imports. Net imports of natural gas, primarily from LNG and Canada, are projected to increase from 3.2 tcf in 2003 to 5.7 tcf in 2025. Imports contributed 14 percent to total natural gas supply in 2003, compared to an expected 19 percent in 2025.

Net U.S. Imports of Natural Gas, 1970-2025
(trillion cubic feet)



Source: *Annual Energy Outlook 2005-High B Oil Price Case*

LNG is expected to supply all of the increase in U.S. imports. We expect that existing LNG terminals will be expanded and that new facilities will also be constructed. LNG imports are expected to reach 3.6 tcf in 2019 and then decline to 3.1 tcf in 2025, as rising natural gas prices cause a decline in demand. In 2025, LNG is expected to equal 11 percent of total U.S. supply. Net Canadian imports are expected to provide 10 percent of total U.S. supply in 2025, down from 14 percent in 2003.

Prices. In the *Annual Energy Outlook 2005* High B case, average natural gas wellhead prices are projected to decline from current high levels to $3.74 per mcf in 2010, in 2003 dollars, due to expanded imports and production of unconventional and offshore natural gas. After 2010, wellhead prices are projected to increase gradually, reaching $5.32 per mcf in 2025 in 2003 dollars. Ultimately, the growth in unconventional sources, Alaskan production, and LNG imports are not expected to increase enough to offset the impacts of resource depletion and increased demand.

End-use natural gas prices are expected to reflect the trend of increasing wellhead prices. A portion of the increase in wellhead prices is expected to be offset by a projected decline in average transmission and distribution margins as a larger proportion of the natural gas delivery infrastructure becomes fully depreciated. Residential consumers, who generally pay the highest costs for distribution infrastructure, will see the largest offset.

This concludes my testimony, Mr. Chairman. I would be glad to respond to any questions you and the other Committee members may have.